

CALIFORNIA CONDORS AT THE GRAND CANYON:

Summary of Biological Information, Education Efforts, and Potential Future Role Of Grand Canyon National Park In the Restoration of Condors In Arizona



2003 End-of-the-Year Report

In December 1996, California Condors (*Gymnogyps californianus*) were first re-introduced from the Vermilion Cliffs in northern Arizona as part of a multi-agency effort to restore condors in the southwestern United States. Since, the population has steadily grown. Over the years the Grand Canyon has developed into an important part of the condors activity area. Condors in years past used only the upper river corridor (i.e., Marble Canyon area) during

the winter/spring, and the South Rim during the summer. In the last two years, the condors have become year-round residents of the South Rim and occur widely throughout the entire canyon during much of the season. This dramatic increase in activity within the park also coincides with an increase in breeding activity. Because condors in Arizona were reintroduced as a “nonessential experimental population,” they are provided limited protection except when on National Refuges or National Park Service lands. Within these areas, the condors in Arizona are afforded full protection as “threatened” and hence these managing bodies must adhere to higher standards of protection for the species. Considering the high levels of condor activity within the park, Grand Canyon is unique among the other cooperators in Arizona in their requirements for biological information.

SUMMARY OF CONDOR INFORMATION

Flock Size

At the beginning of January 2003, the Arizona condor flock numbered 33 birds. This included two birds re-released and five first-time birds from late fall releases. The first release of the year took place in March with the release of three one-year-old birds (studbook #'s 272, 274, and 281). Any further releases were suspended until fall for the remaining one-year-old birds to allow further behavioral maturation. The Peregrine Fund released two new birds (SB#'s 275, and 276) with a re-released bird (#243) in October, however condor #276 was recaptured a few days post-release because of roosting problems. The final release of 2003 occurred 29 November. New condors #273 and #280, and re-released condor #250 were released. Both of the re-released birds released this fall were originally released previously but required re-capturing this summer for behavioral problems (see condor behavior section). Another addition to the flock included one wild-raised chick (#305) that successfully fledged from a nest cave in the Grand Canyon this fall (see nesting efforts and productivity). Amazingly, the Arizona flock suffered only one mortality in 2003. So with the addition of seven newly released condors and one wild chick, while accounting for the one mortality, the population increased to 40 condors in the Arizona/Utah population.

Flock Behavior

Overall the condor flock behavior was exceptional in 2003, especially considering the higher numbers of birds in the South Rim area during the spring and summer. However, there were a few individuals that required removal from the wild for behavioral problems associated with people, and several locations where overall condor behavior was unacceptable.

Condors Removed for “Bad” Behavior

Three condors were temporarily removed from the wild for behavioral problems in 2003. All three were subadult birds that were experiencing the North and South Rims of the Grand Canyon, and the high numbers of people, for the first time. Condor #250 first arrived at the South Rim in early April, and his first encounter with people occurred at Plateau Point in the inner canyon. Condor #250 immediately showed absolutely no fear of humans, and actively approached and initiated interactions with hikers. The majority of interactions #250 had with people occurred along the South Kaibab Trail, especially at Skeleton Point and Cedar Ridge, and also along the rim near Yavapai Point. For several weeks, Park and Peregrine Fund staff actively followed and hazed #250 whenever he was found too close to people but the behavior continued. Condor #250 frequently landed near the trail at Skeleton Point and Cedar Ridge and approached people, occasionally even allowing himself to be surrounded, and on at least two occasions tugged at the shoelaces of hikers. (According to several animal experts at zoos, captive vultures of several species seem fascinated by shoelaces). Condor #250 also approached visitors at Yavapai Point on three occasions, and approached several campers at the remote Monument Creek campground in the inner canyon. Clearly #250 had no sense of his own safety, but also because #250 was attracting other condors into “bad” behavior such as allowing people to approach them, we decided to remove him from the wild. On 19 April, NPS and Peregrine Fund personnel successfully captured #250 when he landed on the rim trail in front of the Bright Angel Lodge, and he was transported back to the holding facility at the Vermilion Cliffs. By far Condor #250 exhibited the worst behavior toward people of any condor in the population this year.

The next condor to be recaptured was #243. This bird was originally released during the late winter of 2002. Several months later he was recaptured for approaching people at Pipe Springs Monument. He was re-released in the fall of 2002, and did extremely well until he arrived at the North Rim in late May. He persistently landed near people and structures for several days running. After extensive hazing, #243 finally left the area and returned to the Vermilion Cliffs. He later spent several days perched directly behind Cliff Dwellers Lodge, and was clearly extremely curious about people and human activity. To prevent #243 from negatively influencing other condors, Peregrine Fund Field Manager Sophie Osborn decided to re-trap him and hold him through the summer.

The third and final bird to be recaptured for behavioral reasons was Condor #232. Condor #232 was probably the worst condor in terms of wariness around people of all the birds that remained in the wild through the spring and summer. When #232 first arrived at the South Rim, he landed on trails at least three different days and allowed people to approach to within a few feet. Condor #232 also landed on top of the backcountry restrooms at The Tipoff (and may have sparked a week of “bad” behavior by the entire flock in doing so), and approached some unattended tents on the North Rim once. Generally speaking though, #232 exhibited acceptable behavior for the remainder of the summer at Grand Canyon. Condor #232 spent extended periods with several other birds in southern Utah beginning mid-summer, and ended up being recaptured for behavioral problems near the end of September.

Although not recaptured, the behavior of one additional bird warranted removal, but she avoided capture. Condor #195 (4 yr. old female) was originally released in 1999 but was recaptured for showing no fear of humans. She was held in captivity for two years before being

re-released in the spring of 2002. Overall we have had very few problems with #195 since her re-release, until a brief period this summer. Condor #195 tried landing on the Desert View watchtower one day, approached a tent at the 10X Campground south of Tusayan the next day, then about one week later approached and tore a small hole in an unoccupied tent at the North Rim. Shortly thereafter, she moved into southern Utah and remained in that area with several other birds the majority of the summer. Unless she re-exhibits such behavior, she'll likely remain in the wild.

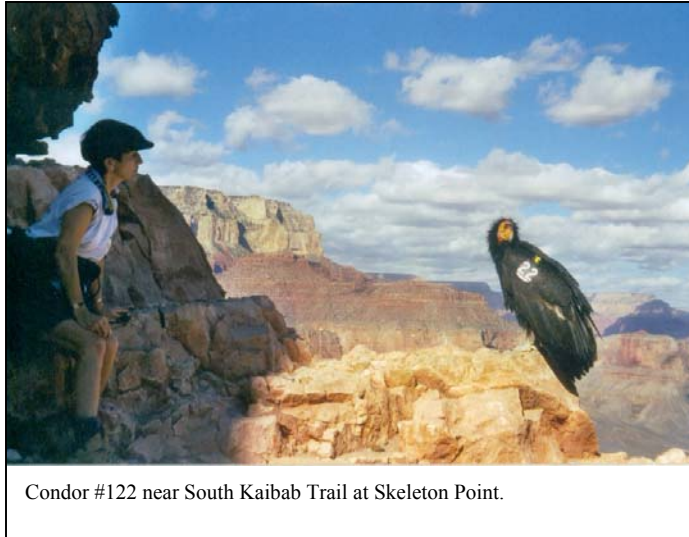
Plateau Point

Plateau Point continued to be a problem area where condors were interacting regularly with visitors. Plateau Point is a prominent overlook in the inner canyon, and is one of the only sites in the inner canyon with exceptionally high visitation year-round. The condors appear to be attracted to the area by the human and raven activity, but feel comfortable there because of the precipitous cliff edges on all sides, the early morning sun, and the plethora of "play items" such as clothing, hats, and trash that blows off the overlook. Additionally, the condors have found a few carcasses (i.e., deer and/or sheep) near Plateau Point. Condors only use Plateau Point during the cooler months, specifically October through April. In addition, the majority of birds in the South Rim area during the winter are the breeding pairs, and they tend to be the most comfortable at Plateau Point. Much of the wildlife at Plateau Point is severely habituated to people, and frequently get "hand-outs." Due in part to its remoteness, and the daily mule-ride trips to the point, intentional feeding of wildlife is worse here than any other place that I'm aware of in the inner canyon. Since condors are attracted to other scavengers such as ravens, condors will almost certainly continue to be attracted to the point until the wildlife feeding is reduced. In 2003 both NPS and Peregrine Fund personnel spent considerable time stationed at the point to haze birds, but due to its remote location and the difficulties of having a person there all the time, Plateau Point was still effectively left unattended much of the time. Although condors eventually stopped visiting Plateau Point once the inner canyon temperatures increased (~mid-April), condors have again begun visiting the point this fall/winter.

Skeleton Point

All the condor problems at Skeleton Point coincided with a dead pack mule that fell from the traverse just below the point. In early March, a pack mule fell ~300 ft coming to rest directly below Skeleton Point on the Old Miner's Route. Within days condors found the carcass, but because of the animal's thick hide the condors were unable to feed on the carcass for several weeks. During this time, birds tended to perch high on the cliffs above the carcass that unfortunately also put them close to the South Kaibab Trail. Over time some of the birds became somewhat comfortable with hikers, and several were approached and possibly even thrown food.

The important factor leading to the problems at Skeleton Point was the attraction to the mule carcass. Once the attractant was removed (via scavenging and decomposition) the activity at Skeleton Point ceased. A similar event happened in early April when another pack mule fell near Cedar Ridge on the South Kaibab Trail. In this situation, the carcass disappeared more quickly because of the additional scavenging by Turkey Vultures (arrived for the summer) and



Condor #122 near South Kaibab Trail at Skeleton Point.

the warmer temperatures, and hence problems of condors landing near the trail only lasted a few days. Although condors may clearly benefit from fallen mule carcasses, the potential behavioral consequences of attracting condors to areas near trails may be too high. Therefore the potential for having condor/hiker problems may need to be factored in to the Standard Operating Procedure for disposal of dead mules, especially carcasses during the colder times of year. Conversely, close coordination and cooperation with the Maintenance Department may insure that

carcasses are disposed of in places of maximum benefit to the condor population (i.e., utilization by breeding birds).

The Tipoff

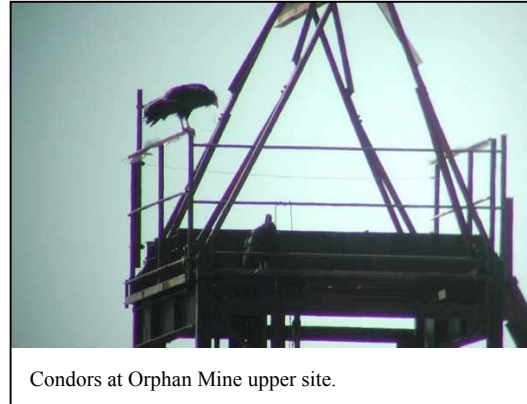
The condor problems at The Tipoff were the strangest and least understood of the year. For about one week in late April, almost every condor in the vicinity of the South Rim converged daily on the backcountry restrooms at The Tipoff. The large brown building was situated on the open flats of the Tonto scrub layer, and had none of the common characteristics of other problem areas. In fact, I'm unaware of any other cases where condors were attracted to a building in the inner canyon. As many as 14 condors were present at this location, many perched on the roof or railings. I suspect a single bird may have been responsible for triggering the flock's interest in the building. Many of the birds were still attracted to the Skeleton Point area (because of the old mule carcass) and a bird such as #232 may have been attracted to the human activity. Once there, others would have followed. Nonetheless, with the invaluable help from rangers and staff from Phantom Ranch, the birds were hazed daily until they lost interest and to-date we've had no reports of condors at The Tipoff.

Grand Canyon Village

The condor behavior in the Grand Canyon village area was better in 2003 than any year previously, which is especially impressive considering the higher numbers of birds. As many as 33 condors were present below the village area at Grand Canyon this summer! Amazingly condors generally landed in "acceptable" locations below the canyon rim, and birds only required hazing periodically. The improved behavior was probably a reflection of the numerous factors including better release strategies by the Peregrine Fund and more effective hazing techniques. Most importantly though, was the consistency and vigilance of Peregrine Fund and NPS staff in monitoring condors in the village area and hazing them when necessary. The excellent behavior in the village evidence that hazing can effectively improve condor behavior.

Orphan Mine

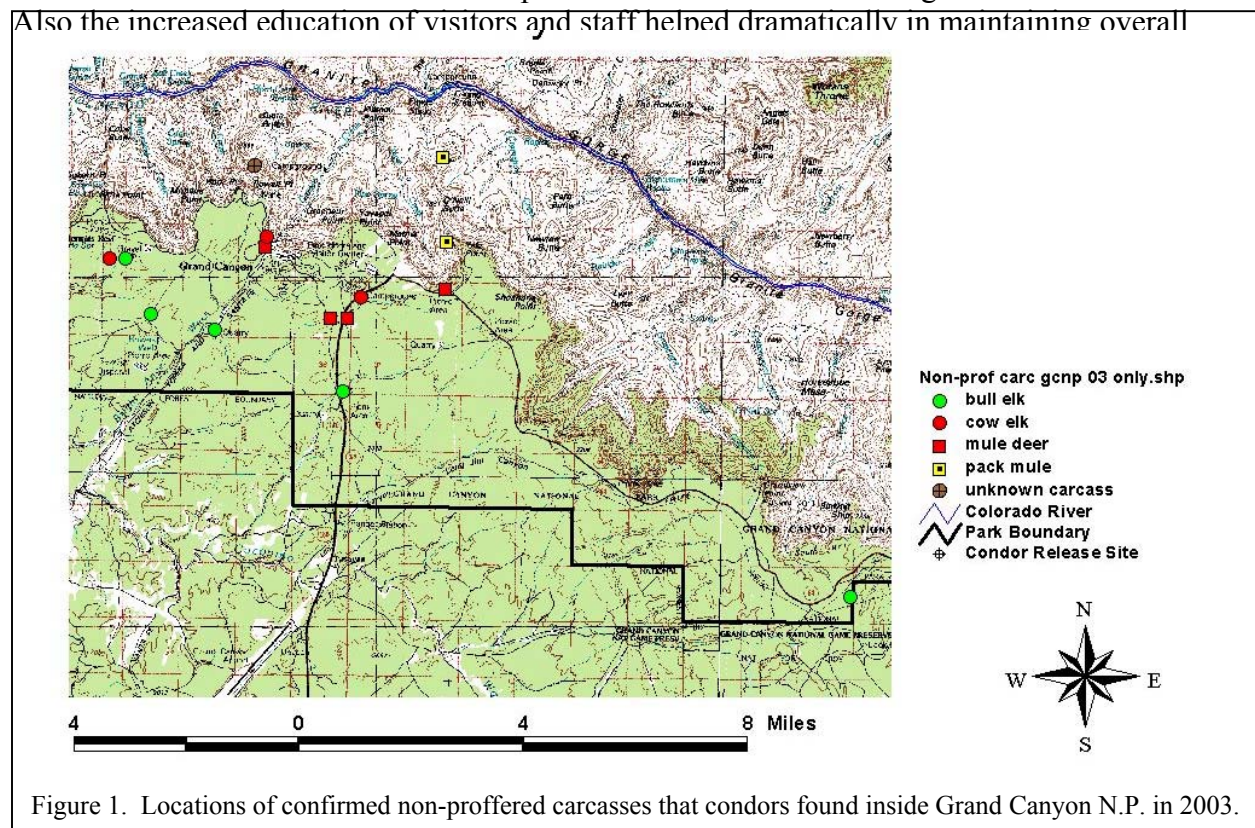
During the summer of 2002, condors exhibited little interest in the Orphan Mine site. Unfortunately that was not the case in 2003. Condors began visiting the Orphan Mine site regularly in June and July, and thereafter periodically through the end of September. As many as 12-13 birds were present at times, and many spent considerable time investigating the old equipment and piles of debris. Because Orphan Mine is potentially hazardous for condors with the existing soil contaminants and radiation in addition to the threat of ingesting foreign objects, we increased efforts to discourage condors from the site. Throughout the months of June and July condors were hazed from the upper mine site almost daily. Generally birds were perched on the mine headframe (mid-structure) or in nearby trees. With persistence and almost constant monitoring by either Peregrine Fund or NPS staff, or Grand Canyon Trust volunteers, condors were mostly excluded from the ground at the upper site from July through the remainder of the summer.



Condors at Orphan Mine upper site.

Summary

In summary, condor behavior in 2003 was overall exceptional when considering the number of condor/days in the park, and the extraordinary potential for birds to come into conflict with people around the South Rim. The problems that did occur involved either a few individuals that have shown a propensity for approaching people, or involved specific areas with unique circumstances. Furthermore, the vast majority of behavioral problems took place during the spring and early summer. This was the time of year with the highest condor numbers at the canyon, and many of the recently released birds arrived for the first time. Most of the serious problems with birds approaching people involved birds that were new to the South Rim. By mid-summer the condors were more dispersed and focused on searching for animal carcasses. Also the increased education of visitors and staff helped dramatically in maintaining overall



roads, and were within 1.3 miles of the park boundary on the South Rim. No parts were missing from any of the carcasses though.

Nesting Efforts and Productivity

Three pairs of condors attempted breeding in 2003, two of which nested in Grand Canyon National Park. One additional pair exhibited all the characteristics of pre-nesting behavior, but we never confirmed egg laying and/or incubation. Condors #119 (female) and #122 (male) re-nested in the same nest cave used in 2002, which was located on the northwest corner of The Battleship formation (hereafter the Battleship Nest) near the South Rim. The second nest involved condors #123 (male) and #127 (female) in the Salt Creek drainage (hereafter the Salt Creek Nest), also near the South Rim. The nest caves of both pairs were similar in that they were located high in the Redwall Limestone and were deep overhung caves. Both nests at Grand Canyon were initiated in the first week of March.

Battleship Nest

Condor #119 laid the egg sometime between 1-4 March in the same nest cave used by this pair in 2002. Incubation proceeded normally with incubation switches occurring every 4-5 days during the first month, and 2-3 days during the weeks leading up to hatching. Immediately before hatching (~6-7 days), the pair switched nest attendance almost daily just as expected. Although the intervals between incubation switches appeared normal, the male had a tendency to take shorter breaks away from the egg than the female. In addition, during the times when the male was incubating the egg, he tended to take longer incubation breaks than the female--normally only 10-30 minutes, the male on at least two occasions left the nest unattended for an hour or more. Nonetheless, the pair switched nest attendance daily from 3-7 May suggesting the egg was in the process of hatching or had hatched. However the pair abruptly abandoned the nest beginning the night of 8 May. The pair spent almost the entire day of 9 May away from the nest site, and the nest was officially considered failed.

On 20 May, ranger Greg Moore and I rappelled into the Battleship nest cave to investigate the cause of the nest failure and retrieve any relevant biological material (nest contents, feathers, etc.). The nest cave was quite large measuring 39 feet from the front edge to



Inside of the Battleship nest cave with egg location in foreground (top) and foreign debris (i.e., plastic, glass, rubber, and aluminum pull-tabs) removed from Battleship nest cave in 2003 (bottom).

the back, and had two chambers—the patio and main chamber (figure 2). Regarding the condor-nesting attempt we found only eggshell fragments. Still we suspect the egg at least began hatching based on the behavior of the parents and the timing of the nest failure. In addition to the eggshell fragments, we found “about a handful” worth of foreign debris. This included: one piece of braided string, one small piece of green fabric, two chunks of clear glass, two pull-tabs from aluminum cans, two clear caps such as those on bottled water containers, seven small pieces of white plastic, one small piece of black plastic, one small rubber loop, and multiple strips of what is believed to be rubber weather stripping-like material (see photo). Some of the items were found on the substrate surface near the eggshell fragments, but most were buried in the substrate on the periphery of the egg location. The two exceptions were the pieces of string and fabric—the string was found near the rock in the patio area, and the fabric was found farther

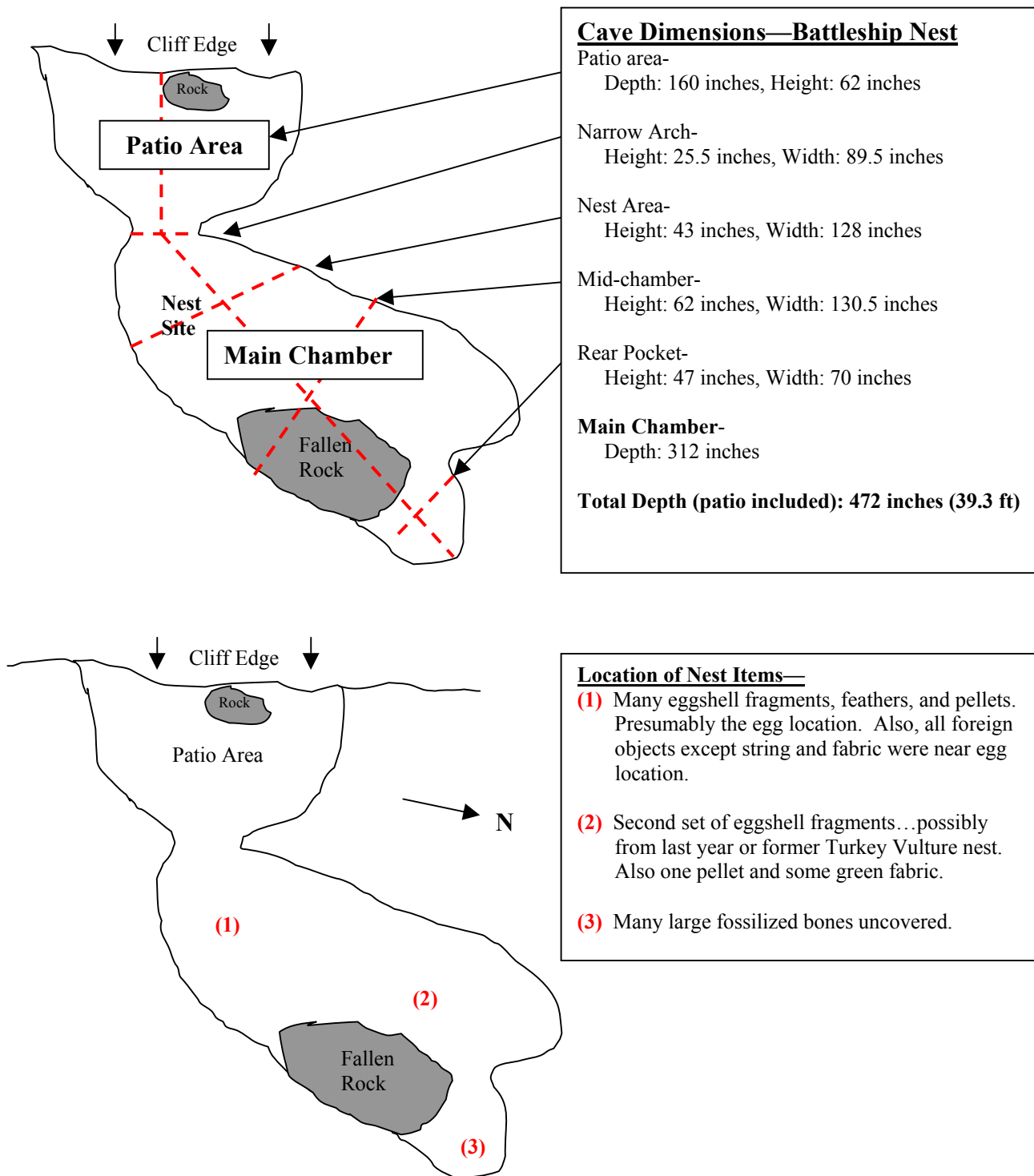


Figure 2. Diagram of the Battleship nest cave shape, characteristics, and dimensions (top), and location of the various nest items (bottom).

back in the main chamber. Many of the items were matted with hair pellet-material and clearly had been eaten and regurgitated by condors. Conceivably, though, other birds may have brought some of the items into the cave as well (e.g., turkey vultures, ravens, etc.). It is important to note that since the nest cave was not thoroughly searched in 2002, the “garbage” collected from the cave in 2003 most likely represents two years of condor nesting activity (2002 and 2003). Nonetheless, these findings confirm condors nesting in the Grand Canyon are ingesting foreign items and bringing them back to the nest, which in some cases, as in California in 2002, could be fatal to a condor chick if ingested. The current belief is condors are seeking out bone fragments to get calcium and are tricked into ingesting other similar-looking items such as shiny glass and/or white plastic. Most likely they are picking the material up and ingesting it while milling around the cliffs below the village area or any of the major overlooks.

Finally, in the deepest part of the nest cave we uncovered several large fossilized bones and bone fragments. Several of the bones were fully intact long bones that were 8-9 inches long, but the majority were small fragments of bone with the exception of a fossilized herbivore tooth. All of the material was examined by a local paleontologist, and he determined the longer bones were from both adult and juvenile condors most likely from the Pleistocene era (10,000 + years), suggesting the cave was likely a prehistoric condor nest site. The smaller bones were from a variety of Pleistocene mammals including horse and brush ox, and the tooth was from a Pleistocene species of bison—all of from condors had presumably fed on, and ingested fragments of bone which they brought back to the nest cave (during the Pleistocene era).

Salt Creek Nest

Condor #127 laid the egg sometime between 1-6 March. At this time, we confirmed the parents were incubating an egg, but the actual nest location was not discovered until 14 March when I hiked into the Salt Creek drainage. The parent's behavior during the incubation period was exemplary. The intervals between incubation switches and the duration of nest breaks followed the typical patterns and behaviorally the pair seemed very focused on the nesting attempt. Only once did either bird take a longer than expected nest break. In late April (~1 week before hatching) the female left the nest cave unattended for approximately 45 minutes during which time she flew to the village area and met up with her mate (#123). She immediately returned to the nest though, and everything proceeded well thereafter. After 3 May, both the male and female spent considerable time in and around the nest cave, and often switched attendance daily. For the remainder of the month, as far as we could tell, the nest was never left unattended. Furthermore, the almost daily nest switches continued through the rest of the month indicating without a doubt the egg had hatched sometime in early in May. Serendipitously, the condors found several non-proffered carcasses during May in the area of the South Rim allowing both parents to spend considerable time at the nest site while still providing plenty of food.

At least one parent roosted at or near the Salt Creek nest every night until 18 June when both roosted at the release site. At this point the chick was approximately 1.5 months old, and able to thermoregulate by itself. From mid-June through late July the parents maintained an unbelievable rate of flying back-and-forth between food sources (including the release site) and the nest site. By mid August, however, the feeding rates dropped to every 2-3 days, but presumably the volume of food remained the same. During this entire time, we were forced to



Wild condor chick #305 in Salt Creek nest cave.

monitor the nest site from the rim, and hence the chick had still not been visually confirmed. That all changed on 16 August when Sophie Osborn (Field Manager for The Peregrine Fund) and I hiked down into Salt Creek and were shocked to discover a large partly feathered chick standing in the cave entrance. The chick appeared healthy, alert, and energetic, as were we after seeing the first wild chick in Arizona in over one hundred years.

From 2 September through the present time, we monitored the Salt Creek nest almost continuously. The chick development and feeding rates by the parents continued without any noticeable problems. Finally after an

extremely long wait, the condor chick (#305) fledged from the nest cave on 5 November at 1339 hrs. This represented the first wild condor chick to fledge anywhere since 1982! To-date the chick has survived 46 days post-fledging (and counting) and has progressed well with its flight development. Still it has remained close to the nest area, and is still fully dependent on the parents for food. We don't expect the chick to be independent until sometime early in 2004.

INTERNAL AND EXTERNAL EDUCATION EFFORTS

There are many misconceptions among the general public when it comes to condor behavior, and the management of condors. I took several steps in 2003 to improve the accuracy of information being communicated to the public and to increase the general awareness among the working community (NPS and concessions staff) at the South Rim. First we published a condor article in the spring and summer Grand Canyon Guide. Second, I prepared several condor talks which I presented to a variety of groups including North and South Rim Interpretive Rangers, concessionaire representatives, Zanterra wranglers and trail crew, shuttle bus drivers, commercial river guides (Guides Training Seminar), and backcountry rangers. I also presented a condor program to several outside groups including Northern Arizona Audubon Society and Grand Canyon Trust. Third, I developed a pattern of updating Marker Marshall from the Interpretation Department regularly with recent condor information, which she in turn sent out via email to all the Interpretive Rangers, Fred Harvey Bus Company (i.e., shuttle bus drivers), Zanterra concessions company (rim store employees, mule wranglers, and trail crew), and others that may be disseminating condor information to the public.

POTENTIAL FUTURE ROLE

This year marked a monumental achievement—the fledging of the first wild-raised chick in 22 years. However condors are far from reaching the recovery goal of self-sustaining. Not only do condors need to be able to reproduce in the wild, but a relatively high percentage

(determined by mortality rates) need also to survive to breeding age (~6-7 yrs) and reproduce themselves. Therefore, the following 5-10 years are absolutely critical for studying and documenting the reproductive rates of condors in the wild. Especially considering the reproductive problems observed in California—of four condor nestlings to reach at least 4 months of age, none has survived beyond fledging.

Considering the unique status of condors inside the park with the experimental non-essential designation, the fact that most of the nesting habitat occurs within the park, and the resource requirements needed for accessing some of the areas in the park, Grand Canyon National Park is in an ideal position to take a leadership role when it comes to monitoring the nesting activity of condors in Arizona. For example, at least 14 birds will be old enough to breed in 2004 and up to six nests are possible. Many of these nests are likely to go undocumented and unmonitored unless NPS staff members are available to conduct the work. Condor nest monitoring and management would be year-round, intensive work requiring several people. The duties would include: locating nests, monitoring nest sites to determine nest success, and potentially conducting as many as two to four nest-site visits per nest, likely requiring extremely technical operations, for carrying out various nest/chick inspections, chick inoculations, chick marking and tagging, nest content retrieval/removal, etc., as deemed necessary by the Southwestern Condor Working Group nest management plan (being developed) and/or the California Condor Recovery Team. The opportunity is unparalleled among the other reintroduction sites, and Grand Canyon National Park is the only entity equipped to adopt such a role at the present time in Arizona.